

What is claimed is:

1. A composition comprising an anti-diabetic agent and a bioavailable source of chromium.
- 5
2. A composition comprising an anti-diabetic agent and a bioavailable source of chromium, whereby said composition reduces initial Hb1Ac levels observed in a patient by at least a 10% change from the baseline after treatment.
- 10
3. A composition comprising an anti-diabetic agent and a bioavailable source of chromium, whereby said composition reduces initial Hb1Ac levels observed in a patient by at least a 50% change from the baseline after treatment.
- 15
4. The composition of claim 1, wherein said bioavailable source of chromium comprises one or more of chromium picolinate or chromium polynicotinate.
- 20
5. The composition of claim 1, wherein said anti-diabetic agent comprises a type of anti-diabetic agent selected from the group consisting of insulin, thiazolidinediones, sulfonylureas, benzoic acid derivatives, and alpha-glucosidase inhibitors.
6. The composition of claim 1, wherein said anti-diabetic agent is metformin.
- 25
7. The composition of claim 6, wherein metformin is in the range of about 100 mg up to about 2550 mg per dose.
8. The composition of claim 1, wherein said anti-diabetic agent is a sulfonylurea.
- 30
9. A composition according to claim 8, wherein said sulfonylurea is acetohexamide, chlorpropamide, tolazimide, tolbutamide, glycazide, glipizide, glyburide, or glimeperide.

10. A composition according to claim 1, wherein said anti-diabetic agent is a thiazolidinedione.

11. A composition according to claim 10, wherein said thiazolidinedione is troglitazone, rosiglitazone, or pioglitazone.

12. A composition according to claim 1, wherein said anti-diabetic agent is an alpha-glucosidase inhibitor.

10 13. A composition according to claim 12, wherein said alpha-glucosidase inhibitor is acarbose or miglitol.

14. A composition according to claim 1, wherein said anti-diabetic agent is a benzoic acid derivative.

15 15. A composition according to claim 14, wherein said benzoic acid derivative is repaglinide.

20 16. The composition of claim 1, wherein said bioavailable source of chromium comprises more than 300 mcg elemental chromium.

17. The composition of claim 1, further comprising an effective amount of a bioavailable source of vanadium.

25 18. The composition of claim 17, wherein said bioavailable source of vanadium is vanadyl sulfate.

19. The composition of claim 1, further comprising an effective amount of a bioavailable source of one or more of the following: chromium, magnesium, and aspirin.

30 20. A composition comprising an anti-diabetic agent and a bioavailable source of vanadium.

21. A composition comprising an anti-diabetic agent and a bioavailable source of vanadium, whereby said composition reduces initial Hb1Ac levels observed in a patient by at least a 10% change from the baseline after treatment.

5 22. A composition comprising an anti-diabetic agent and a bioavailable source of vanadium, whereby said composition reduces initial Hb1Ac levels observed in a patient by at least a 50% change from the baseline after treatment.

10 23. The composition of claim 20, wherein said anti-diabetic agent comprises a type of anti-diabetic agent selected from the group consisting of insulin, thiazolidinediones, sulfonylureas, benzoic acid derivatives, and alpha-glucosidase inhibitors.

15 24. The composition of claim 20, wherein said anti-diabetic agent is metformin.

25. The composition of claim 24, wherein metformin is in the range of about 100 mg up to about 2550 mg per dose.

20 26. The composition of claim 20, wherein said anti-diabetic agent is a sulfonylurea.

25 27. A composition according to claim 26, wherein said sulfonylurea is acetohexamide, chlorpropamide, tolazimide, tolbutamide, glycazide, glipizide, glyburide, or glimeperide.

28. A composition according to claim 20, wherein said anti-diabetic agent is a thiazolidinedione.

30 29. A composition according to claim 28, wherein said thiazolidinedione is troglitazone, rosiglitazone or pioglitazone.

30. A composition according to claim 20, wherein said anti-diabetic agent is an alpha-glucosidase inhibitor.

31. A composition according to claim 30, wherein said alpha-glucosidase inhibitor is acarbose or miglitol.

5 32. A composition according to claim 20, wherein said anti-diabetic agent is a benzoic acid derivative.

33. A composition according to claim 32, wherein said benzoic acid derivative is repaglinide.

10 34. The composition of claim 20, wherein said bioavailable source of vanadium is vanadyl sulfate.

15 35. The composition of claim 20, wherein said bioavailable source of vanadium comprises more than 10 mg elemental vanadium.

36. The composition of claim 20, further comprising an effective amount of a bioavailable source of chromium, wherein said bioavailable source of chromium is chromium polynicotinate.

20 37. The composition of claim 20, further comprising an effective amount of a bioavailable source of one or more of the following: chromium, magnesium, and aspirin.

25 38. A method for improving glucose metabolism, comprising administering to a patient an anti-diabetic agent and bioavailable source of chromium.

39. The method of claim 38, wherein said bioavailable source of chromium comprises one or more of chromium picolinate or chromium polynicotinate.

30 40. The method of claim 38, wherein said anti-diabetic agent comprises a type of anti-diabetic agent selected from the group consisting of insulin, thiazolidinediones, sulfonylureas, benzoic acid derivatives, and alpha-glucosidase inhibitors.

41. The method of claim 38, wherein said anti-diabetic agent is metformin.

42. The method of claim 38, wherein said bioavailable source of chromium comprises more than 300 mcg elemental chromium.

5

43. The method of claim 38, further comprising administering an effective amount of a bioavailable source of vanadium.

44. The method of claim 38, wherein said bioavailable source of vanadium is
10 vanadyl sulfate.

45. The method of claim 38, further comprising an effective amount of a bioavailable source of one or more of the following: vanadium, magnesium, and aspirin.

15 46. A method for improving glucose metabolism, comprising administering to a patient an anti-diabetic agent and bioavailable source of vanadium.

47. The method of claim 46, wherein said bioavailable source of vanadium comprises vanadyl sulfate.

20

48. The method of claim 46, wherein said anti-diabetic agent comprises a type of anti-diabetic agent selected from the group consisting of insulin, thiazolidinediones, sulfonylureas, benzoic acid derivatives, and alpha-glucosidase inhibitors.

25

49. The method of claim 46 wherein said anti-diabetic agent is metformin.

50. The method of claim 46, wherein said anti-diabetic agent is a thiazolidinedione.

30

51. The method of claim 50, wherein said thiazolidinedione is troglitazone, rosiglitazone, or pioglitazone.

52. The method of claim 46, further comprising an effective amount of a

bioavailable source of one or more of the following: vanadium, magnesium, and aspirin.

53. An ingestible formulation for improving glucose metabolism in a subject with abnormal glucose metabolism, comprising:

- 5 (a) a bioavailable source of chromium in a complex and amount that delivers an effective amount of chromium for improving glucose metabolism; and
(b) an anti-diabetic agent.

54. The ingestible formulation of claim 53, wherein said amount of said 10 bioavailable source of chromium is no less than 200 mcg of elemental chromium.

55. The ingestible formulation of claim 53, further comprising an effective amount of one or more of the following: aspirin, Vitamin E, and magnesium.

15 56. The ingestible formulation of claim 53, wherein said anti-diabetic agent comprises a type of anti-diabetic agent selected from the group consisting of insulin, thiazolidinediones, sulfonylureas, benzoic acid derivatives, and alpha-glucosidase inhibitors.

20 57. The ingestible formulation of claim 53, wherein said anti-diabetic agent is metformin.

58. An ingestible formulation for improving glucose metabolism in a subject with abnormal glucose metabolism, comprising:

- 25 (a) a bioavailable source of vanadium in a complex and amount that delivers an effective amount of vanadium for improving glucose metabolism; and
(b) an anti-diabetic agent.

59. The ingestible formulation of claim 58, wherein said amount of said 30 bioavailable source of vanadium is no less than 5 mg of elemental vanadium.

60. The ingestible formulation of claim 58, further comprising an effective amount of one or more of the following: aspirin, Vitamin E, and magnesium.

61. The ingestible formulation of claim 58, wherein said anti-diabetic agent comprises a type of anti-diabetic agent selected from the group consisting of insulin, thiazolidinediones, sulfonylureas, benzoic acid derivatives, and alpha-glucosidase inhibitors.

5

62. The ingestible formulation of claim 58, wherein said anti-diabetic agent is metformin.

63. The use of an ingestible formulation which improves glucose metabolism
10 in a subject for the manufacture of a medicament for the treatment of glucose metabolism disorders, wherein said ingestible formulation comprises a bioavailable source of chromium in a complex and amount that delivers an effective amount of chromium for improving glucose metabolism, and an anti-diabetic agent.

15 64. The use of an ingestible formulation which improves glucose metabolism in a subject for the manufacture of a medicament for the treatment of glucose metabolism disorders, wherein said ingestible formulation comprises a bioavailable source of vanadium in a complex and amount that delivers an effective amount of vanadium for improving glucose metabolism, and an anti-diabetic agent.

20

65. The use of claim 63 or 64, wherein said anti-diabetic agent is selected from the group consisting of insulin, thiazolininediones, sulfonylurease, benzoic acid derivatives, and alpha-glucosidase inhibitors.

25

66. The use of an ingestible formulation which improves glucose metabolism in a subject for the development of a regimen for the treatment of glucose metabolism disorders, wherein said ingestible formulation comprises a bioavailable source of chromium in a complex and amount that delivers an effective amount of chromium for improving glucose metabolism, and an anti-diabetic agent.

30

67. The use of an ingestible formulation which improves glucose metabolism in a subject for the development of a regimen for the treatment of glucose metabolism disorders, wherein said ingestible formulation comprises a bioavailable source

of vanadium in a complex and amount that delivers an effective amount of vanadium for improving glucose metabolism, and an anti-diabetic agent.

68. The use of claim 66 or 67, wherein said anti-diabetic agent is selected from the group consisting of insulin, thiazolidinediones, sulfonylurease, benzoic acid derivatives, and alpha-glucosidase inhibitors.

69. A pill for improving glucose metabolism in a subject with abnormal glucose metabolism, comprising:

10 (a) a bioavailable source of chromium in a complex and amount that delivers an effective amount of chromium for improving glucose metabolism; and
(b) an anti-diabetic agent.

70. The pill of claim 69, wherein said amount of said bioavailable source of chromium is no less than 5 mg of elemental chromium.

71. The pill of claim 69, further comprising an effective amount of one or more of the following: aspirin, Vitamin E, and magnesium.

20 72. The pill of claim 69, wherein said anti-diabetic agent comprises a type of anti-diabetic agent selected from the group consisting of insulin, thiazolidinediones, sulfonylureas, benzoic acid derivatives, and alpha-glucosidase inhibitors.

73. The pill of claim 69, wherein said anti-diabetic agent is metformin.
25

74. A pill for improving glucose metabolism in a subject with abnormal glucose metabolism, comprising:

(a) a bioavailable source of vanadium in a complex and amount that delivers an effective amount of vanadium for improving glucose metabolism; and
30 (b) an anti-diabetic agent.

75. The pill of claim 74, wherein said amount of said bioavailable source of vanadium is no less than 5 mg of elemental vanadium.

76. The pill of claim 74, further comprising an effective amount of one or more of the following: aspirin, Vitamin E, and magnesium.

77. The pill of claim 74, wherein said anti-diabetic agent comprises a type of 5 anti-diabetic agent selected from the group consisting of insulin, thiazolidinediones, sulfonylureas, benzoic acid derivatives, and alpha-glucosidase inhibitors.

78. The pill of claim 74, wherein said anti-diabetic agent is metformin.

10 79. The use of a pill which improves glucose metabolism in a subject for the manufacture of a medicament for the treatment of glucose metabolism disorders, wherein said ingestible formulation comprises a bioavailable source of chromium in a complex and amount that delivers an effective amount of chromium for improving glucose metabolism, and an anti-diabetic agent.

15 80. The use of a pill which improves glucose metabolism in a subject for the manufacture of a medicament for the treatment of glucose metabolism disorders, wherein said ingestible formulation comprises a bioavailable source of vanadium in a complex and amount that delivers an effective amount of vanadium for 20 improving glucose metabolism, and an anti-diabetic agent.

25 81. The use of claim 79 or 80, wherein said anti-diabetic agent is selected from the group consisting of insulin, thiazolininediones, sulfonylurease, benzoic acid derivatives, and alpha-glucosidase inhibitors.

82. The use of a pill which improves glucose metabolism in a subject for the development of a regimen for the treatment of glucose metabolism disorders, wherein said ingestible formulation comprises a bioavailable source of chromium in a complex and amount that delivers an effective amount of chromium for improving glucose metabolism, 30 and an anti-diabetic agent.

83. The use of a pill which improves glucose metabolism in a subject for the development of a regimen for the treatment of glucose metabolism disorders, wherein said

ingestible formulation comprises a bioavailable source of vanadium in a complex and amount that delivers an effective amount of vanadium for improving glucose metabolism, and an anti-diabetic agent.

5 84. The use of claim 82 or 83, wherein said anti-diabetic agent is selected from the group consisting of insulin, thiazolininediones, sulfonylurease, benzoic acid derivatives, and alpha-glucosidase inhibitors.

10 85. A kit for improving glucose metabolism in a subject comprising:
 (a) an ingestible formulation for improving glucose metabolism in a subject comprising a bioavailable source of chromium in a complex and amount that delivers an effective amount of chromium for improving glucose metabolism, and an anti-diabetic agent; and
 (b) instructions for the administration of said ingestible formulation.

15 86. The kit of claim 85, wherein said instructions provide for the simultaneous administration of chromium and anti-diabetic agent, and provide the daily dosage regimen and duration of treatment.

20 87. A kit for improving glucose metabolism in a subject comprising:
 (c) an ingestible formulation for improving glucose metabolism in a subject comprising a bioavailable source of vanadium in a complex and amount that delivers an effective amount of vanadium for improving glucose metabolism, and an anti-diabetic agent; and
 (d) instructions for the administration of said ingestible formulation.

25 88. The kit of claim 87, wherein said instructions provide for the simultaneous administration of vanadium and anti-diabetic agent, and provide the daily dosage regimen and duration of treatment.

30 89. A kit for improving glucose metabolism in a subject comprising:
 (a) a pill comprising an effective amount of a bioavailable source of chromium a complex and amount that delivers an effective amount of

chromium for improving glucose metabolism, and an anti-diabetic agent; and

- (b) instructions for the administration of said pill.

5 90. The kit of claim 89, wherein said instructions provide the daily dosage regimen and the duration of treatment.

91. A kit for improving glucose metabolism in a subject comprising:

- 10 (a) a pill comprising an effective amount of a bioavailable source of vanadium in a complex and amount that delivers an effective amount of vanadium for improving glucose metabolism, and an anti-diabetic agent; and
- (b) instructions for the administration of said pill.

15 92. The kit of claim 91, wherein said instructions provide the daily dosage regimen and the duration of treatment.

93. A kit for improving glucose metabolism in a subject comprising:

- 20 (a) a bioavailable source of chromium in a complex and amount that delivers an effective amount of chromium for improving glucose metabolism; and
- (b) instructions for the administration of said bioavailable source of chromium.

25 94. The kit of claim 93, wherein said instructions provide for the daily dosage regimen and duration of treatment.

95. A kit for improving glucose metabolism in a subject comprising:

- 30 (a) a bioavailable source of vanadium in a complex and amount that delivers an effective amount of vanadium for improving glucose metabolism; and
- (b) instructions for the administration of said bioavailable source of vanadium.

96. The kit of claim 95, wherein said instructions provide for the daily dosage regimen and duration of treatment.